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"Science of Science Communication"**

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Mediated trust in science: concept, measurement and perspectives for the ‘science of science communication’

Mike S. Schäfer

Abstract

Trust in science is, to a considerable extent, the outcome of communication. News and online media in particular are important mediators of trust in science. So far, however, conceptual works on mediated trust in science are lacking. Taking a cue from Weingart & Guenther, this commentary proposes a concept of mediated trust in science and for its measurement, and shows where it could be used in the science of science communication.

Keywords

Science and media, Science communication: theory and models

Introduction

I wholeheartedly agree with the premise of Weingart and Guenther’s article: scholars of science communication should discuss the concept of trust more. Trust has become a central category for the analysis of modern society, with important contributions by sociologists [e.g. Giddens, 1990; Luhmann, 2000], political scientists [Fukuyama, 1995], and economists [e.g. Gambetta, 1988], among others. Trust is particularly important with regards to science. More than other realms of society, science is a specialized, expert endeavor difficult to comprehend for outsiders. Therefore, trust in science is important — both for societies, for which science produces the best available knowledge for upcoming challenges and decisions [Fischhoff and Scheufele, 2013, p. 14031], and also for science, which will always be unable to fully explain itself to outside publics and decision-makers, yet strongly depends on their support and resources [cf. Weingart, 2005].

And trust in science is, to a considerable extent, the outcome of mediated communication. Most people do not have direct contact to scientists or scientific organizations, and do not regularly visit public lectures, science fairs or science cafes. To a large degree, they derive their knowledge about and image of science from communication, i.e. from journalistic media such as newspapers or magazines, TV or radio as well as from online sources and social media [e.g. BBVA foundation, 2011; National Science Board, 2014]. These sources provide symbolic indicators which, together with people’s knowledge, values, political ideologies and identities [e.g. Myers et al., 2016; Roberts et al., 2011], influence their trust in science.

**Counteracting the
“conceptual
confusion”:
conceptualizing
(mediated) trust**

The rising importance of trust has led to a growing number of publications in the ‘science of science communication’ focusing on trust, its antecedents and outcomes [for an overview see Engdahl and Lidskog, 2014, p. 704]. Most of these publications are empirical studies, focusing on trust in science in general [e.g. Gauchat, 2011; Roberts et al., 2011], on research fields like environmental [Brewer and Ley, 2013] and climate science [Hmielowski et al., 2014; Myers et al., 2016], or on scientific applications like genetically modified food [Einsiedel, 2002; Marques, Critchley and Walshe, 2015].

But so far, conceptual works on trust are lacking. A “conceptual confusion” [Lewis and Weigert, 1985, p. 975] still lingers, as “few researchers have been interested in the fundamental character of trust”, and therefore, “the concept need[s] further elaboration” [Engdahl and Lidskog, 2014].

I will use an understanding mainly developed by sociologists. They define trust “as the ego’s acceptance of dependency on the outer world or the alter in the absence of information about the outer world or the alter’s reliability, in order to create an otherwise impossible outcome” [Engdahl and Lidskog, 2014, p. 710]. Trust, in this view, is “relational, emotional, asymmetrical, and anticipatory” [Engdahl and Lidskog, 2014, p. 713], an enumeration that will be unpacked here in reverse order:

- Trust is *anticipatory*, firstly, because it “is a bet about the future contingent actions of others” [Sztompka, 1999, p. 25]. It is useful in situations where an individual actor — *ego* — cannot fully forecast the actions of relevant others — the *alteri* — yet still has to rely on them [Bentele, 1994, p. 141; Kohring, 2001]. If ego can trust alter in such a situation, he or she is enabled to act [cf. Luhmann, 2000].
- Secondly, trust is *asymmetrical*. It is built on an “acceptance of dependency” [Barbalet, 2009, p. 368ff; Engdahl and Lidskog, 2014, p. 710f] between givers and recipients of trust, with the first depending on the latter’s future actions. Even seemingly mutual trust, in this conception, is understood as “two separate instances of trust, each of which involves an asymmetrical relationship” [Engdahl and Lidskog, 2014, p. 711].
- Such an ‘acceptance of dependency’ has a rational component, a conscious decision by ego to rely on alter. This reflexive side of trust has been emphasized, for example, by rational choice theorists [e.g. Coleman, 1991; Gambetta, 1988]. But such a perspective “emphasizes the cognitive-reflexive aspect of trust at the expense of its emotional aspect” [Engdahl and Lidskog, 2014, p. 713], while trust, thirdly, involves an ego’s confidence in an uncertain future and, therefore, has an *emotional* component.
- Trust is, finally, *relational*, because it eventually refers to the actions of others [e.g. Coleman, 1982; Luhmann, 2000; Sztompka, 1999]. Analytically, it consists of the relation between a *giver of trust*, like a member of the public, trusting a *recipient of trust* that can be a person, a group, an organization or even a social system such as ‘science’, with regards to the recipient’s future actions [Coleman, 1991; Sztompka, 1999] (see figure 1).

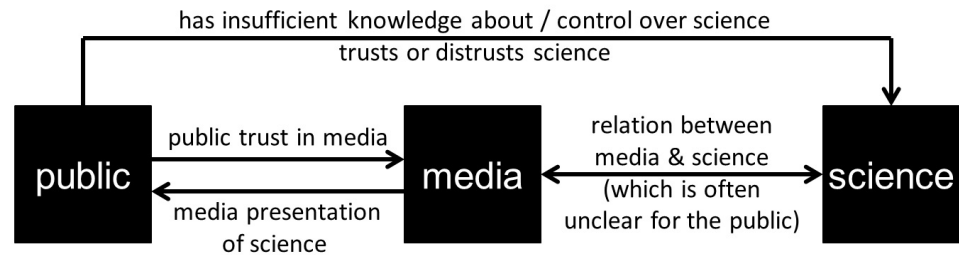


Figure 1. Schematic model of mediated trust in science [mainly based on Bentele, 1994; Engdahl and Lidskog, 2014; Kohring, 2001; Kohring, 2004; Luhmann, 2000; Sztompka, 1999].

Trust, in this sense, is a functional equivalent for an *ego's* knowledge about, or control over, an *alter's* action. It is important to note that trust, therefore, is not achieved by *ego* acquiring more knowledge about *alter*, or by gaining control over *alter*. In sharp contrast, trust is a substitute for knowledge and control [Kohring, 2001]. With regards to trust in science, that means that in situations where members of the public do not know exactly what science does and have no means of substantially influencing it, they may (have to) make a “leap of faith” [Engdahl and Lidskog, 2014, p. 708] and trust science.

This basic constellation between the public and science is further complicated by trust intermediaries like media. Public trust in science is, to a considerable degree, influenced by media representations of science, its protagonists and institutions. Given the detachment of science from society, it can even be argued that media representations have a stronger impact on public trust in science than on public trust in the economy, art, religion, or maybe even politics. Newspapers and magazines, radio, television as well as new media provide “symbolic indicators” [Bentele, 1994] of science’s trustworthiness upon which public trust in science can be based. In doing so, trust intermediaries “double” the configuration of trust [Kohring, 2004, p. 165]: they are themselves potential objects whom the public may or may not trust [Bentele, 1994, p. 136; see figure 1].

Improving the measurement of trust

Along with the underdeveloped conceptual side of trust, its measurements have been limited. Trust in science is mostly assessed in standardized surveys, where single questions asking for trust in leaders of the scientific community [e.g. National Science Board, 2014, p. 7–32f], in scientists as sources of information [e.g. BBVA foundation, 2011], or in science as a whole serve as indicators.

While such measurements have merits, particularly if they can be compared across countries or over time, they also should be broadened in several ways. On the one hand, the various *objects of public trust in science should be differentiated*. Firstly, and in line with the general literature on trust which distinguishes trust in persons, institutions and systems [for an overview see Endress, 2002, p. 53ff], trust in scientists, scientific institutions as well as in the system of science should be delineated, and more differentiations, e.g. between disciplines or fields of science, might be useful. On the other hand, a measurement of mediated trust in science has to take its multiple objects — namely science and media — into account. It has to distinguish between both, and should enable researchers to assess the relative importance of both factors in the production of mediated trust in science.

Secondly, general measures of trust could be supplemented by *multidimensional measurements of public trust in science*. Such approaches have been established in psychological studies on trust, with recent studies distinguishing three core dimensions [Hendriks, Kienhues and Bromme, 2015]: “expertise”, i.e. the competence of scientists, scientific institutions or science; “integrity”, i.e. their adherence to established scientific standards; and “benevolence”, i.e. the question whether they have good intentions as seen from the perspective of the public.

**Trust in the future:
research
perspectives for
analyzing
mediated trust in
science**

Apart from improving concept and measurement, empirical challenges for the analysis of mediated trust in science exist. Firstly, *assessing the determinants of mediated trust in science* is necessary. Scholars of science communication do not yet know what kinds of media representations effectively trigger trust in science. Catalogues of potential triggers exist, mentioning, for example, the relevance of portrayed expertise, of consistency in communication, of a general openness towards the public or of testimonials by trusted third parties [Bentele, 1994, p. 144f; Nawratil, 1997] — but they are empirically unproven or focus on trust in objects other than science. Conceptually, a systematic assessment is necessary which would have to integrate fields such as “signaling approaches” [Neuberger, 2013, p. 108], research in credibility [e.g. Metzger and Flanagin, 2013], forensic linguistics [e.g. Olsson and Luchjenbroers, 2013] and other fields.

Secondly, *processes of trust generation require more analysis*. Both with regards to mediated trust in science and to trust in general, long-term processes of building-up trust have not been investigated [cf. Endress, 2002, p. 53ff; Engdahl and Lidskog, 2014]. Reconstructing these, and identifying their driving factors, albeit challenging, would move the field considerably further.

Thirdly, the *recent multiplication of the abovementioned constellation of mediated trust demands scholarly attention*. Media as trust intermediaries have always been heterogeneous, with considerable differences in the extent to which they are trusted by different publics [e.g. Schäfer, 2012, p. 71]. This heterogeneity is even more prevalent nowadays on social media: on the one hand, they provide new contexts for established media content. In social media, articles or news segments on science are not presented in a vacuum but embedded in a flurry of heuristic cues such as “likes”, “shares”, comments etc. which may influence how trust indicators are taken up [cf. Anderson et al., 2014]. On the other hand, social media has made novel ways of social recommendation possible in which new individuals and institutions can become opinion leaders [Nisbet and Kotcher, 2009; Schäfer and Taddicken, 2015] and trust intermediaries [Tsang and Zhou, 2005].

Fourthly, scholars of science communication should *focus on the role of distrust in science*. Conceptually, they should discuss whether distrust is ‘just’ a lack of trust, or a different phenomenon [Hardin, 2004, p. esp. 11ff]. Empirically, the relation between recent phenomena of pseudoscience and conspiracy theories around science-related issues like evolution, climate science or vaccination should be analysed [Engdahl and Lidskog, 2014, p. 703].

In sum, mediated trust in science is becoming more important, while the respective research still contains considerable gaps. More conceptual work is needed, as well

as studies aiming specifically for those research gaps. Many of the questions asked in this commentary are as urgent as they difficult to answer — and I am thankful to Weingart and Guenther for initiating this discussion.

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